Bull. Kagoshima Pref. College, 44 (1993), 13−25

Research on Crossover (I)

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I. Introduction

Generally speaking, the phenomena of crossover can be considered in two ways; strong crossover and weak crossover. The crucial point to consider the peculiarities of strong crossover is the concept of c-command between the pronoun and the variable. The sentence with the phenomena of strong crossover is completely different from that of weak crossover in the degree of the acceptability.

In Section II, some explanations about strong crossover are manifested, applying the appropriate theories; binding theory, control theory, and so on. To consider the peculiarities, some tentative sentences are manifested, in which some problems can be found based upon the recent GB theory.

This research on crossover will be divided into two parts. In the following paper, some examples including weak crossover will be manifested; parasitic gap, *tough*-movement, *too-enough* movement, and topicalization, applying the recent GB theory. To consider some peculiarities of weak crossover, some tentative modifications of the recent GB theory will be manifested. In addition to this, the function of operators will be manifested, and some attempts to find the similarity of quantifiers will be shown. Furthermore, some hypothesis about operators will be manifested, trying to find the similarity of quantifier hierarchy.

II. Strong Crossover

Postal (1971)[1] is the first to manifest the peculiarities of crossover phenomena, but there exists the diversity of the acceptability among crossover phenomena. Among the theories unsettled, the degree of crossover seems to play a crucial element to decide whether the sentence is grammatical or not. Among the recent theories about crossover, Howard Lasnik and Tim Stowell[2] seem to suggest the most suitable analysis on crossover phenom-

[1] P. Postal. (1971). *Cross-Over Phenomena*. New York: Holt, Rinehart & Winston.

ena. The basic concept about crossover phenomena depends upon the positions of three elements; some kind of operators, pronouns, and the traces. In other words, the concept whether the pronoun and the trace have c-command relations with each other or not seems to play a crucial point to decide the acceptability.

However, the concepts about operators, pronouns, and the traces seem to be confusing sometimes. A little consideration seems to show what the operators are when we consider the crossover phenomena, and whether the pronouns are variables or not.

Generally speaking, operators involve *wh*-elements and quantifiers and some kinds of noun phrases. However, the concept of null operators seems to play a very important role to decide the acceptability of the sentence with weak crossover; namely, parasitic gap and so on. That is to say that the concept of null operators is one kind of operators according to the wide interpretation. In addition to this, some kinds of noun phrases seem to be considered as an operator, but the detailed explanations about these noun phrases have never been manifested yet. In the logical form, the concept of operators plays a very important element, since quantifiers can be raised by the operation called quantifier raising in the CP position. Indeed, we admit the hierarchy of quantifiers suggested by Ioup[3] and Kuno[4], some hierarchies of operators seem to be suggested; namely, there seems to be some hierarchy in the CP position. According to the similar notion of X'-theory suggested by Jackendoff[5], the number of bars in the CP position seems to suggest the similar notion of quantifier hierarchy. The similarity between operators and quantifiers in the hierarchy has never been discussed even now. According to the same notion about quantifier hierarchy, some peculiarities of operators must be formulated.

According to the basic similarities between quantifiers and *wh*-elements, sometimes *wh*-elements are called suspected quantifiers, the interpretation can be manifested clearly as follows:[6]

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[2] H. Lasnik and T. Stowell. (1991). "Weakest Crossover." *Linguistic Inquiry* Vol. 22 No. 4. pp. 687−720.

[3] G. Ioup. (1975). "Some Universals for Quantifier Scope." *Syntax and Semantics* Vol. 4. (ed. J. Kimball). New York : Academic Press. pp. 37−58.

[4] S. Kuno. (1990). "Remarks on Quantifier Scope." *Current English Linguistics in Japan.* Current Trends in Linguistic Series (ed. H. Nakajima). The Hague: Mouton.

[5] R. Jackendoff. (1977) *X' Syntax: A Study of Phrase Structure.* Cambridge, Mass.: MIT Press.

[6] S. Haraguchi and M. Nakamura (eds.). (1992). *Kenkyusha's Dictionary of Theoretical Linguistics.* Tokyo : Kenkyusha. p. 335.

(1) a. Everyone saw John.

b. Mary bought something.

In the logical form, the sentences above have the following representation:[7]

(2) a. [$_S$ Everyone [$_S$ t saw John]].

b. [$_S$ Something [$_S$ Mary bought t]].

Everyone and *Something* in the sentences above can be interpreted logically as follows:[8]

(3) a. for every x, x a person, x saw John.

(4) b. for some x, x a thing, Mary bought x.

In the same way, the logical representation of *wh*-phrases is as follows:[9]

(5) a. Who did you see?

(6) b. for which x, x a person, you see x?

Besides, the interpretation of a pronoun may be confusing sometimes; namely, the interpretation whether the pronoun is a variable or not has a very important element to decide the meaning of the sentence. In this point, Howard Lasnik and Tim Stowell have claimed that a pronoun may be construed as a bound variable as follows:[10]

> A pronoun may be construed as a variable in contexts such as (1) :
>
> (1) a. Every man thinks he is lucky.
>
> b. Who dislikes his boss?
>
> c. Which man did you say dislikes his boss?
>
> d. No man should mistreat his friends.
>
> In (1 a-d) the pronoun *he* or *his* is ambiguous between referential construal, where it refers to a particular individual, and a bound variable construal, where it behaves like a variable bound by the *wh*-phrase or Quantifier Phrase (QP). We will assume that the bound variable construal is represented structurally by means of coindexing the pronoun with the *wh*-phrase or QP.

The interpretation whether a pronoun is a variable or not depends upon the position in the LF representation; a variable must be bound by the operator in the LF representation, then the interpretation of a pronoun has to be coindexed. The general movement of *wh*-phrase and quantifier phrase is that these elements must be moved to an operator position, where at the LF level, the trace must be bound as a variable. At the LF level, the position is called an operator position, but, considering the movement, the position itself may be a specifier

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[7] *Ibid.*. p. 335.

[8] *Ibid.*. p. 335.

[9] *Ibid.*. p. 335.

[10] H. Lasnik and T. Stowell. "Weakest Crossover." p. 687.

position suggested by Chomsky as follows :[11]

> It follows that apart from X^0-movement to head position, substitution will always move a maximal projection to the specifier position. The two major cases will be NP movement to the subject of IP (=S) or NP and *wh*-movement to the specifier of CP(=S'). Movement to head position is narrowly constrained by the interaction of principles of UG, one major case being movement of V to I, forming the inflected verb V_I, with possible subsequent movement of V_I to C.

It is interesting to note whether the similar interpretation can be done or not based upon the quantifier hierarchy on their inherent tendency toward wider scope suggested by Ioup:[12]

Table 1

Greatest inherent tendency
toward highest scope
each
every
all
most
many
several
some(+NP_{pl})
a few
Least inherent tendency
toward highest scope

By applying such hierarchies of quantifiers, some other peculiarities may be found, but such an approach has not been done by applying the recent GB theory. The problems that the corresponding sentences with other quantifiers may have the same interpretation whether the pronoun may be construed as a bound variable or not remain unsolved.

(7) Each man thinks he is lucky.
(8) Every man thinks he is lucky. (= (1) a, Lasnik and Stowell)
(9) All men think they are lucky.
(10) Most men think they are lucky.
(11) Many men think they are lucky.

[11] N. Chomsky. (1986). *Barriers*. Cambridge, Mass. : MIT Press. p. 4 .
[12] G. Ioup. "Some Universals for Quantifier Scope." p. 42.

(12) Several men think they are lucky.

(13) Some men think they are lucky.

(14) A few men think they are lucky.

In addition to these sentences with quantifiers, the following sentences seem to show the interesting peculiarities as suggested by R. May.[13]

> Clearly, a grammar that assumes the general application of the ECP and the Scope Principle will be extensionally equivalent, at least with respect to the cases considered thus far, to a grammar that simply stipulates that the ECP is not relevant, for whatever reasons, to representations like those in (7). In such a grammar it would not be necessary to assume the Scope Principle. There is evidence, however, indicating the correctness of an approach that does. Thus, consider (12), which illustrates an interesting interaction between *wh*-phrases and universal quantifiers:
>
> (12) What did everyone buy for Max ?
>
> A question like (12) displays an ambiguity; it may be understood, loosely, either as a single question, asking for the identity of the object such that everyone bought it for Max, or as a "distributed" question, asking of each individual what it is that that person bought for Max. On the former construal (13 a) is an appropriate answer; on the latter, (13 b). I return to the relevant semantics in the next section.
>
> (13) a. Everyone bought Max a Bosendorfer piano.
>
> b. Mary bought Max a tie, Sally a sweater, and Harry a piano.
>
> (14) is the LF-representation of (12); it differs from the S-Structure representation of (12) only in that via LF-movement the subject NP has been adjoined to S, a position from which it properly governs it trace. The trace of the *wh*-phrase in COMP is properly governed by the verb:
>
> (14) $[_{S'}$ what$_2$ $[_S$ everyone$_3$ $[_S$ e$_3$ bought e$_2$ for Max]]]

Another explanation by May about the sentence of the *wh*-phrase is as follows:[14]

> (16) Who bought everything for Max?
>
> The ambiguity of (12) starkly contrasts with the nonambiguity of (16), which has only the interpretation as a single collective question. Thus, only (17) is an appropriate answer to (16):

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[13] R. May. (1985). *Logical Form: Its Structure and Derivation.* Cambridge, Mass. : MIT Press. pp. 37−38.

[14] *Ibid.*. p. 39.

(17)　Oscar bought everything for Max.

Notice that (13b), *Mary bought Max a tie, Sally a sweater, and Harry a piano*, is not an appropriate answer to (16), from which it can be concluded that (16) does not express a distributed question of the sort associated with (12). Examples like (12) and (16) thus exhibit a subject-object asymmetry, turning on whether a subject or an object *wh*-phrase has been moved to COMP.

Besides, May shows the LF-representation of (16) as follows:[15]

We have already answered half of the question: quantifying *into* a question is possible just when a structure can be derived at LF that satisfies the Scope Principle. We have seen this to be so in (14). But now consider (21), the LF-representation of (16), derived (as is (14)) by adjunction of the quantified phrase to S:

(14)　$[_{S'}$ what$_2$ $[_S$ everyone$_3$ $[_S$ e$_3$ bought e$_2$ for Max]]]

(21)　$[_{S'}$ who$_3$ $[_S$ everything$_2$ $[_S$ e$_3$ bought e$_2$ for Max]]]

(21), in contrast to (14), violates the ECP. This is because the subject empty category is not properly governed, the presence of the intervening S-adjoined phrase serving to block this (just as in (7a)). Thus, an LF-representation under which (16) would be construed as ambiguous is not derived. But this raises a problem. What is the LF-representation of (16)? After all, the claim is only that it is unambiguous, not that it is ungrammatical.

To consider the peculiarities of crossover, these three elements have to be manifested clearly, for the definitions of three elements have not been settled in some way.

According to the most recent analysis of strong crossover suggested by Lasnik and Stowell,[16] the condition of Binding Theory can explain the peculiarities of strong crossover. Sometimes, strong crossover can be treated as a violation of Condition C of the binding theory. In the early theory, Chomsky defines as follows :[17]

Binding Theory:

(A)　An anaphor is bound in its governing category.

(B)　A pronominal is free in its governing category.

(C)　An R-expression is free.

Throughout, the binding is A-binding. Apart from inverted post-verbal NP, to which we turn in § 4.5, each anaphor, pronominal and R-expression is in an A-position,

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[15] *Ibid.* . p. 41.

[16] H. Lasnik and T. Stowell. "Weakest Crossover." pp. 687−720.

[17] N. Chomsky. (1981). *Lectures on Government and Binding*. Dordrecht : Foris. p. 188.

within the range of constructions that I am considering here.

Then, the binding theory can be formulated as follows :[18]

(A) An anaphor is A-bound in its governing category.

(B) A pronominal is A-free in its governing category.

(C) An R-expression is A-free.

Considering the sentences with strong crossover, the interpretation of the variable may be confusing sometimes. The basic peculiarities of the binding relations may be considered that variables are treated as R-expressions. The basic fact of strong crossover can be shown by explaining the acceptability of the following tentative sentences:

(15) a. Who$_i$ said Mary tried to persuade him$_j$?

b. *Who$_i$ said Mary tried to persuade him$_i$?

(16) a. Who$_i$ said he$_j$ tried to persuade Tom$_k$?

b. *Who$_i$ said he$_i$ tried to persuade Tom$_i$?

c. *Who$_i$ said he$_j$ tried to persuade Tom$_i$?

d. *Who$_i$ said he$_j$ tried to persuade Tom$_j$?

(17) a. Who$_i$ did you say Mary tried to persuade t_i?

b. *Who$_i$ did you say Mary tried to persuade t_j?

(18) a. Who$_i$ did you say he$_j$ tried to persuade t_j?

b. *Who$_i$ did you say he$_i$ tried to persuade t_i?

(19) a. Who$_i$ did you say he$_j$ made you visit t_j?

b. *Who$_i$ did you say he$_i$ made you visit t_i? (=(7) a, Lasnik and Stowell)[19]

(20) a. He$_i$ tried to persuade everybody$_j$.

b. *He$_i$ tried to persuade everybody$_{i,j}$.

c. *He$_i$ tried to persuade nobody$_i$.

(21) *He$_i$ saw me visit nobody$_i$. (=(7) b, Lasnik and Stowell)[20]

Logically, the sentences above can be expressed as follows:

(15)' for which x, x said Mary tried to persuade him

(16)' for which x, x said he tried to persuade Tom

(17)' for which x, you said Mary tried to persuade x

(18)' for which x, you said he tried to persuade x

(19)' for which x, you said he made you visit x

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[18] H. Lasnik and T. Stowell. "Weakest Crossover." p. 688.

[19] *Ibid.*. p. 688.

[20] *Ibid.*. p. 688

(20a, b)' for every x, x a person, he tried to persuade x

(20c)' for no x, x a person, he tried to persuade x

(21)' for no x, x a person, he saw me visit x

The logical representations seem to be helpful to consider the variable construal. To consider the interpretation of the variable, the c-command relations have a very important element.

Considering the peculiarities of strong crossover, the most important element that the pronoun c-commands its trace. Then, the most recent definition of c-command has to be manifested clearly. The definition of c-command, different from that of m-command, suggested by Chomsky is as follows:[21]

> Let us turn to the notion of c-command and government, giving first a schematic characterization, which refinements to be investigated as we proceed. Putting aside adjunction structures such as (11) ($=[_{\beta}\ \alpha\ [_{\beta}\ldots]]$[22] for the moment, we may understand "c-command" in a general way as follows :
>
> (13) α c-commands β iff α does not dominate β and every γ that dominates α dominates β.
>
> Where γ is restricted to maximal projections (following Aoun and Sportiche 1983),[23] we will say that α *m-commands* β.

The tentative sentences shown above : (15)−(21) are helpful to manifest the peculiarities of strong crossover, where the interpretations of *wh*-phrase, pronoun, and the trace have a very important element to decide the acceptability of the sentences. In deciding the acceptability, binding theory mentioned above is very helpful. In addition to this, sentence (15), (16), (17), (18), (19), (20) may contain a persuasive theory to be applied. In these sentences, the control theory can have a very important element to decide the acceptability. Binding theory refers to the condition (A), (B), and (C) mentioned above, these tentative sentences contain the control verb *persuade*, then each sentence can have a pronominal anaphor : PRO. Generally speaking, PRO can be treated as a pronominal anaphor. Every anaphor has to suffice Condition (A), then every anaphor must be locally A-bound in its governing category. However, PRO can be interpreted as a pronoun also, then PRO has to suffice Condition (A) and Condition (B) at the same time. However, the interpretation of PRO whether the feature is anaphoric or pronominal needs more detailed research.

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[21] N. Chomsky. *Barriers*. p. 8.

[22] *Ibid.*. p. 7.

[23] J. Aoun and D. Sportiche. (1983). "On the Formal Theory of Government." *The Linguistic Review* 3. pp. 211−235.

The variable construal in sentence (19b) cannot be considered as suggested by H. Lasnik and T. Stowell,[24] then the typical example of the strong crossover can be considered in sentence (19 b). In sentence (19 b), the pronoun *he* c-commands its trace, while in sentence (19 a), the pronoun *he* cannot c-command the trace, for the pronoun *he* and the trace are not coindexed with each other. The relation of c-command is the typical peculiarity of strong crossover. In the strong crossover as sentence (19), Condition C of the binding theory is violated if the pronoun is coreferential with the *wh*-phrase and its trace, since the pronoun *he* A-binds the variable trace. If the pronoun has the different index, Condition C can be satisfied, then the sentence may be acceptable.

In addition to these expressions ((15)'− (21)'), the LF representations can well show the degree of the acceptability as follows, for the variables can be manifested at LF level.

(22) a. $[_{CP}$ who$_i$ t$_i$ $[_{IP}$ said $[_{CP}$ Mary tried $[_{IP}$ PRO to persuade him$_j$]]]]

b. *$[_{CP}$ who$_i$ t$_i$ $[_{IP}$ said $[_{CP}$ Mary tried $[_{IP}$ PRO to persuade him$_i$]]]]

(23) a. $[_{CP}$ who$_i$ t$_i$ $[_{IP}$ said $[_{CP}$ he$_j$ tried $[_{IP}$ PRO to persuade Tom$_k$]]]]

b. *$[_{CP}$ who$_i$ t$_i$ $[_{IP}$ said $[_{CP}$ he$_i$ tried $[_{IP}$ PRO to persuade Tom$_i$]]]]

c. *$[_{CP}$ who$_i$ t$_i$ $[_{IP}$ said $[_{CP}$ he$_j$ tried $[_{IP}$ PRO to persuade Tom$_i$]]]]

d. *$[_{CP}$ who$_i$ t$_i$ $[_{IP}$ said $[_{CP}$ he$_j$ tried $[_{IP}$ PRO to persuade Tom$_j$]]]]

(24) a. $[_{CP}$ who$_i$ $[_{C'}$ did you say $[_{CP}$ Mary tried $[_{IP}$ PRO to persuade t$_i$]]]]

b. *$[_{CP}$ who$_i$ $[_{C'}$ did you say $[_{CP}$ Mary tried $[_{IP}$ PRO to persuade t$_j$]]]]

(25) a. *$[_{CP}$ who$_i$ $[_{C'}$ did you say $[_{CP}$ he$_j$ tried $[_{IP}$ PRO to persuade t$_j$]]]]

b. *$[_{CP}$ who$_i$ $[_{C'}$ did you say $[_{CP}$ he$_i$ tried $[_{IP}$ PRO to persuade t$_i$]]]]

(26) a. $[_{CP}$ who$_i$ $[_{C'}$ did you say $[_{CP}$ he$_j$ made you$_1$ [e$_1$ visit t$_j$]]]]

b. *$[_{CP}$ who$_i$ $[_{C'}$ did you say $[_{CP}$ he$_i$ made you$_1$ [e$_1$ visit t$_i$]]]]

(27) a. $[_{IP}$ everybody$_j$ $[_{IP}$ he$_i$ tried $[_{IP}$ PRO to persuade t$_j$]]]

b. *$[_{IP}$ everybody$_{i,j}$ $[_{IP}$ he$_i$ tried $[_{IP}$ PRO to persuade t$_{i,j}$]]]

c. *$[_{IP}$ nobody$_i$ $[_{IP}$ he$_i$ tried $[_{IP}$ PRO to persuade t$_i$]]]

(28) *$[_{IP}$ nobody$_i$ $[_{IP}$ he$_i$ saw me$_1$ $[_{CP}$ e$_1$ visit t$_i$]]]

The representations (22) − (28) can show the difference of the acceptability, for the variable construal is different from each other. The LF representations are the tentative analysis, so that the detailed analyses need to be discussed ; the restriction of adjunction structures, the notion of bars, the notion of barriers and so on, in particular, the notion of barriers needs to be discussed by applying the different two levels : L-marking and the minimality condition. However, considering the peculiarities of crossover, the binding

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[24] N. Chomsky. *Lectures on Government and Binding*. p. 185.

theory and the control theory can have a plausible element to explain.

In sentence (22), the only interpretation of the pronoun *him* is outside the referential meaning of the sentence ; namely, outside the governing category. Then, the trace cannot be interpreted as a bound variable within the sentence, for this fact violates Condition (A) of the binding theory ; namely, the anaphor is A-bound in its governing category. Indeed, the trace *t* can be an anaphor, but in addition to such a trace, a pronominal anaphor can be considered as an anaphor. Considering the peculiarities of the pronominal anaphor, PRO has to suffice Condition (A) and (B) of the binding theory at the same time. Then, the pronoun has to be A-free in its governing category. The antecedent of PRO in sentence (22) has to be the NP in the nearest upper clause, then *Mary* is the antecedent of PRO; namely, the controller of PRO. Then, the verb *try* can be called a subject control verb. The pronominal anaphor has no influence on some other variables.

In sentence (23), the only interpretation that the *wh* - trace, the pronoun, the proper noun cannot be coindexed seems to be acceptable. In sentence (22) and (23), the trace in the specifier of CP has no relation with the binding theory, for an anaphor has to be A-bound in its governing category ; namely, not A'-bound. However, the backward pronominarization as in (23 b, d) cannot be operated, for the proper noun cannot c-command the pronoun and the *wh*-phrase. Considering the peculiarities of the control theory, the antecedent of PRO; the controller, cannot be found in the lower phrase, then the proper noun *Tom* cannot be a controller of PRO. This means that PRO has to be coindexed as the pronoun *he*; otherwise, as PRO cannot have its antecedent, this fact violates Condition (A). There may be a little difference of the acceptability between sentence (23c) and sentence (23b, d), for in sentence (23 c), the pronoun *he* and the proper noun *Tom* are not coindexed with each other. This means that the pronoun *he* can be treated as an R-expression.

In sentence (24), the only interpretation that the trace and its *wh*-phrase are coreferential can be accepted, but the different index cannot be accepted. The controller of PRO can be the proper noun *Mary*, but in sentence (24 b) the trace *t* cannot have an anaphor in its governing category; namely, this violates Condition (A): an anaphor is locally A-bound in its governing category. Besides, as the indexes between the trace and its *wh*-phrase are distinct, the trace cannot move to the specifier position, the degree of the acceptability seems to be extremely low.

In sentence (25), the pronoun cannot A-binds the variable trace, so that the only interpretation of the distinct index seems to be accepted; the crucial point of strong crossover is that the pronoun c-commands the trace. Then, in sentence (25a) and (25b), the typical

strong crossover can be found, so that the degree of the deviation seems to be extremely high. In addition to this violation, in sentence (25a), the trace cannot move to the specifier position of CP, so that the degree of deviation seems to be higher than that of sentence (25b). Considering the control theory, the controller of PRO may be pronoun *he*, the index is completely different from each other. However, PRO has to be coindexed with its controller, then PRO in sentence (25a) has a coindexed controller. It seems to be dubious that the trace, and PRO, and the pronoun are coindexed, but in sentence (25a), the specifier position of CP has to be a different index. Then, the *wh*-movement is impossible, so that the degree of the deviation seems to be extremely high, different from that of (25 b). In sentence (25b), the pronoun cannot c-commands the variable trace, and it is also dubious whether the pronoun, PRO, and the variable trace can be coindexed or not. However, because of the impossibility of *wh*-movement in sentence (25a), the degree of the deviation seems to be extremely high.

In sentence (26a) and sentence (26b), both sentences seem to be deviant, but in sentence (26a), the pronoun c-commands the trace, and the bound variable construal cannot be considered. Then, the bound variable seems to be treated as an R-expression; namely, this sentence seems to contain the violation of Condition (C) of the binding theory. In addition to this, the definition of variables has to be considered in detail. There seems to be lots of dubious points to be unsolved even now. In sentence (26b), two sides of strong crossover can be found; namely, the pronoun cannot c-command the trace, and the trace cannot cross over the pronoun to move to the specifier position of CP.

In sentence (27) and sentence (28), the quantifier as an operator at the LF level c-commands the variable trace, but the pronoun cannot be interpreted as a bound variable. However, in sentence (27a), the pronoun *he* can be treated as an R-expression. In sentence (27b), and (27c), the pronoun c-commands the variable trace. This is a typical peculiarity of strong crossover, then the degree of the deviation seems to be extremely high. Considering the control theory, the controller of PRO can be the pronoun *he* in IP, but it seems to be a dubious problem whether the bound variable can be permitted or not in this condition. These sentences seem to show the difference of strong crossover, but the interpretation of the variables seems to be manifested clearly, for the detailed definition seems to contain various dubious points to be unsolved even now.

As suggested by Chomsky,[25] the standard definition of variables is as follows :

(6) α is a variable if and only if

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[25] N. Chomsky. *Lectures on Government and Binding*. p. 185.

(i)　$\alpha = [_{NP}\ e]$

(ii)　α is in an A-position (hence bears an A-GF)

(iii)　there is a β that locally A'-binds α

. . . In the case of a variable, the binder β in (6) may be an operator, a trace in COMP, an empty NP in COMP, or some other element adjoined to S or S'. This formulation leaves open a variety of questions about the class of rules I have been calling "movement-to-COMP," as a loose designation.

In addition to the definition shown above, Chomsky further defines the variables as follows:[26]

We call α an *empty category* if $\alpha = [_{NP}\ F\ ]$, where $F \subset \phi$, F non-null. If α is not an empty category, call it a *lexical category*. We now have the definition (9) and the principle (10):

(9)　α is a variable if and only if it is locally A'-bound and in an A-position

(10)　If α is an empty category and not a variable, then it is an anaphor

Quite probably, (10) will follow from a more principled characterization of the notion "anaphor," perhaps along the lines sketched informally in § 3.2.3. We stipulate further that variables are either empty categories or pronouns, admitting the case of resumptive pronouns. The class of A-positions will be slightly modified directly.

Considering the definitions of variables mentioned above, the problem whether the trace is locally A'-bound in an A-position or not seems to play a very important element to satisfy the condition (9). To manifest the binding relations between the pronoun and the trace, the tentative sentences above with strong crossover seem to prove the necessity of the interpretation of variables suggested by Chomsky. In sentence (22a), the trace is in the specifier position of CP in the maximal projection; A'-position, then the trace has no relation with the condition (9). As the pronoun appears in the object position in the embedded CP, this pronoun seems to be treated as an R-expression, since the coreferential NP of the pronoun seems to exist outside the domain of the sentence. Then, this possessive pronoun cannot have some kind of the antecedent in the sentence. This fact proves that (22 b) is not acceptable. In sentence (23a) also, the trace is in the specifier position of CP in the maximal projection, where the condition (9) suggested by Chomsky cannot be considered, for the trace itself has no relation with A-position. The same consideration can be done to examine the acceptability of the sentence.

However, the recent interpretation of variables needs to be discussed more in detail,

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[26] *Ibid.*. p. 330.

for Condition (C) of the binding theory seems to be considered deeply, since the R-expression and variables cannot share the domain with each other; namely, the domain of A-free seems to be completely different from each other.

In this paper, the tentative sentences with strong crossover have been focused, but various definitions of the theory seem to be modified from now. In the following paper, some tentative analyses will be shown; operators, quantifier hierarchy, various examples of weak crossover and so on, modifying the recent GB theory.

(To be continued)

References

Aoun, J. and D. Sportiche. (1983). "On the Formal Theory of Government." *The Linguistic Review* 3. pp. 211−235.

Chomsky, N. (1981). *Lectures on Government and Binding.* Dordrecht: Foris.

_____ (1986). *Barriers.* Cambridge, Mass. : MIT Press.

Haraguchi, S. and M. Nakamura (eds.) (1992). *Kenkyusha's Dictionary of Theoretical Linguistics.* Tokyo: Kenkyusha.

Ioup, G. (1975). "Some Universals for Quantifier Scope." *Syntax and Semantics* Vol. 4 (ed. J. Kimball). New York: Academic Press.

Jackendoff, R. (1977). *X' Syntax: A Study of Phrase Structure.* Cambridge, Mass. : MIT Press.

Kuno, S. (1990). "Remarks on Quantifier Scope. " *Current English Linguistics in Japan.* Current Trends in Linguistic Series. (ed. H. Nakajima). The Hague:Mouton.

Lasnik, H. and T. Stowell. (1991). "Weakest Crossover." *Linguistic Inquiry* Vol. 22 No. 4. pp. 687−720.

May, R. (1985). *Logical Form: Its Structure and Derivation.* Cambridge, Mass. : MIT Press.

Postal, P. (1971). *Cross-Over Phenomena.* New York: Holt, Rinehart & Winston.

(Received October 1, 1993)